Supplemental Specification
2005 Standard Specification Book

SECTION 13554

POLYMER CONCRETE JUNCTION BOX

Delete Section 13554 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for installing polymer concrete junction boxes, ground rods, and maintenance markers. Includes Type I, Type II, and Type III Polymer-Concrete Junction Boxes.

1.2 RELATED SECTIONS

A. Section 01721: Survey

B. Section 02056: Common Fill

C. Section 02061: Select Aggregate

D. Section 02842: Delineators

E. Section 02892: Traffic Signal

F. Section 03055: Portland Cement Concrete

G. Section 03152: Concrete Joint Control

H. Section 03575: Flowable Fill

I. Section 13551: General ATMS Requirements

J. Section 13553: ATMS Conduit

1.3 REFERENCES

A. ASTM C 109: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm cubes)

B. ASTM C 496: Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

C. ASTM C 579: Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

D. ASTM C 580: Standard Test Methods for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes

E. ASTM C 857: Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures

F. ASTM C 1028: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method

G. ASTM D 543: Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents

H. ASTM D 570: Standard Test Method for Water Absorption of Plastics

I. ASTM D 635: Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastic in a Horizontal Position

J. ASTM G 154: Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

K. American National Standards Institute (ANSI)

L. Underwriters Laboratory (UL)

PART 2 PRODUCTS

2.1 FILL

A. Free draining granular backfill borrow per Section 02061.

B. Granular backfill borrow per Section 02056.

C. Flowable fill per Section 03575.

2.2 JUNCTION BOXES AND LIDS

A. Junction boxes: pre-cast polymer concrete. Refer to AT Series Standard Drawings for dimensions of junction box types.

B. Furnish boxes, rings, and lids that sustain a minimum vertical test load of 33,500 lbs (AASHTO HS 20 loading) as a stand-alone unit, over a 10-inch x 20-inch square steel plate centered on the cover and body as per ASTM C 857-95 design load A-16.

C. Furnish boxes, rings, and lids that meet the physical and chemical requirements listed in Table 1:

Table 1

Physical and Chemical Properties of Junction Box Components		
Property	**ASTM Test**	**Value**
Compressive Strength	C 109	11,000 psi
Flexural Strength	C 580	1,800 psi
Tensile Strength	C 496	1,700 psi
Effects of Acids	D 543	Very Resistant
Effects of Alkalies	D 543	Very Resistant

D. Furnish junction boxes that are tested according to the following ASTM testing procedures. Provide results upon request.
1. Ultraviolet Inhibitors: ASTM G 154
2. Flame-Resistance: ASTM D 635
3. Water Absorption Resistance: ASTM D 570

E. Furnish lids that have a non-skid surface for pedestrian traffic with a minimum coefficient of friction of 0.50 per ASTM C 1028 without the use of coatings.

F. Lids for all junction boxes are specified by application. Manufacture lids with the following markings in the logo area, in 1-inch recessed letters:
   1. "Traffic Signal" when the junction box contains cables or wires for a traffic signal (Refer to Section 02892), CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element (Refer to Section 13551).
   2. "Electric" when the junction box contains power conductors used for a traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.
   3. "Street Lighting" when the junction box contains street lighting conductors only. Inscribe "High Voltage" below the words "Street Lighting" when the junction box contains voltage above 600 V.
   4. "Communication" when the junction box contains fiber optic cable or future use multi-duct conduit.
   5. "Sprinkler Control" when the junction box contains sprinkler control conduit.

G. Lid Access Points: recessed reinforced steel pull slots to allow removal of cover with a hook or lever. Replace lid if damage occurs to the pulling point.

H. Bolts: stainless steel recessed hex head bolts with washer according to AT Series Standard Drawings.

2.3 MAINTENANCE MARKERS

A. Fiber Glass posts: Orange, 4 inch wide by 4 ft tall, labeled "UDOT Fiber Optics." Refer to Section 02842.

2.4 CONDUIT PLUGS

A. Refer to Section 13553.

2.5 GROUND ROD

A. 8 ft x $^{5}/_{8}$ inch copper-coated steel ground rod as specified by ANSI/UL 467

2.6 WIRING

A. Ground Wire: Refer to Section 13551.

2.7 CONCRETE COLLAR

A. Class AA(AE) concrete. Refer to Section 03055.

2.8 EXPANSION JOINT MATERIAL

A. Expansion joint material. Refer to AT Series Standard Drawings and Section 03152.

2.9 PULL TAPE

A. Pull Tape: Refer to Section 13553.

2.10 LOCATE BALL OR DISK

A. Greenlee Omni Marker or approved equal.

PART 3 EXECUTION

3.1 BACKFILL

A. Place 12 inches of free draining granular backfill borrow under junction boxes.

B. Hand tamp granular backfill borrow or approved native soil around the junction box collar. Match the top 8 inches to the composition, density, and elevation of the surrounding surface.

3.2 JUNCTION BOX AND EXTENSION

A. Install per manufacturer's recommendations.

B. Precast junction boxes with precast conduit holes or drill holes to match conduit entry where required without damaging the box. Use grout to create a complete seal between conduit and the structure wall. Finish grout smooth and flush with the interior wall.
   1. Holes drilled in junction box must not be more than ¼-inch larger than conduit diameter.
   2. Seal conduit ends inside all junction boxes with at least 2-inch thick duct caulking after wires are installed.
   3. Seal vacant conduit with a manufactured conduit plug and attach detectable pull tape according to Section 13553.

C. Level the top of junction box and grade accordingly.

D. Field-locate junction boxes to avoid steep slopes and low lying locations with poor drainage.

E. Do not install junction boxes within the traveled way or shoulders.

F. Install bushings on end of all metallic conduits before cable installation.

G. Conduit in junction box:
   1. Do not install conduit within 2 inches of corner of junction box.
   2. Extend all conduit 2 to 6 inches beyond the inside wall of the junction box.
   3. Align ATMS conduit ends by color at each side of the box.
   4. Enter conduit through the sides of the junction box and not from the bottom.
   5. Place the conduit in the bottom half of the junction box wall at least 3 inches above the floor.
   6. Refer to AT Series Standard Drawings.

H. Saw cut concrete or other surfaces that require removal in the sidewalk area.
   1. Remove entire section of sidewalk.
   2. Replace with in-kind materials to match the existing grade.

I. Install Engineer-approved ½-inch expansion joint material around entire periphery of ring for junction boxes installed in paved surface.

J. Record GPS coordinates for all junction boxes according to Section 01721 and show on as-built drawings.

K. Encase all conduit in flowable fill where conduit enters the junction box.

L. Provide a poured-in-place 1-inch thick grout floor, with a 1-inch diameter drain at the low point, for all Type I, II, and III-Polymer Concrete Junction Boxes or provide a box with a prefabricated floor with a 1-inch drain hole. Grout in accordance with ASTM C 579 and ASTM C 580.

M. Do not stack boxes.

N. Provide maintenance markers for junction boxes on freeways and rural highways. Place maintenance markers:
   1. A minimum of 20 ft from edge of pavement if junction boxes are within 20 ft of edge of pavement.
   2. At right-of-way where junction box is within 20 ft of right-of-way.
   3. Within 2 ft of junction box at all other locations.

3.3 CONCRETE COLLAR

A. See AT Series Standard Drawings.

B. Concrete: AA(AE) Refer to Section 03055.

C. Install concrete collars around junction boxes in all locations except where junction boxes are in concrete paved surfaces.

D. Secure ½-inch expansion joint material around the junction box before placing concrete collar.

3.4 GROUND ROD

A. Install ground rod to extend maximum 2 inches above box floor.

B. Attach splice enclosure to the ground rod with a ground wire.

3.5 LOCATE BALL OR DISK

A. Place locate ball or disk in each ATMS junction box.

3.6 RESTORATION

A. Restore all areas damaged during the installation of the junction boxes at no additional cost to the Department.

END OF SECTION